

TRANSMITTAL OF APPEAL BRIEF (Large Entity)Docket No.
GRLK-P078-USIn Re Application Of: **David W. Bartley, et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/629,888	July 29, 2003	Taylor V. Oh	27268	1625	5567

Invention: **PROCESS FOR PRODUCING TETRABROMOBENZOATE ESTERS****RECEIVED**

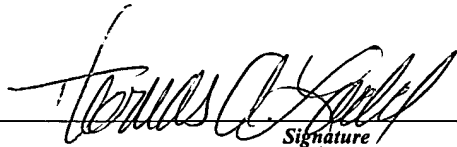
JUN 16 2006

COMMISSIONER FOR PATENTS:**TECH CENTER 1600/2900**

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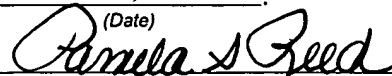
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Dated: June 9, 2006

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**U.S. PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

Appeal Brief
Page 1 of 24

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Applicant: David W. Bartley, et al.

Atty. Docket No.: GRLK-P078-US

Group Art Unit No.: 1625

Application No.: 10/629,888

Filed: July 29, 2003

Title: PROCESS FOR PRODUCING
TETRABROMOBENZOATE
ESTERS

Examiner: Taylor V. Oh

Confirmation No.: 5567

CERTIFICATE OF MAILING

(37 C.F.R. § 1.8(a))

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By:

Pamela S. Reed
June 9, 2006

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APPEAL BRIEF

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**U.S. PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

Applicant submits its Appeal Brief in its appeal of its *ex parte* patent application referenced above.

I. Real Party in Interest

Great Lakes Chemical Corp. W. Lafayette, Indiana which is wholly owned by Chemtura Corporation, Middlebury, Connecticut.

II. Related Appeals and Interferences

None.

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III. Status of Claims

Claims 1-15, 17-32, and 34-35 are pending.

Claims 1-15, 17-32, and 34 stand finally rejected pursuant to 35 USC §112, second paragraph.¹

Claims 1-15, 17-32, and 34-35 stand finally rejected under to 35 USC §103(a) pursuant to U.S. 5,637,757 in view of U.S. 4,375,551, and further in view if US 5,728,760.

A rejection of claims 16-18 and 33-35 as anticipated pursuant to 35 USC §102 (b) by U.S. 5,637,757 was withdrawn in the Final Office Action dated 6/27/2005.

A rejection of claims 19-32 as anticipated pursuant to 35 USC §102 (b) by U.S. 5,637,757 was withdrawn by the Advisory Action dated 9/20/2005.

No claims presently stand rejected as anticipated pursuant to 35 USC §102 (b).

IV. Status of Amendments

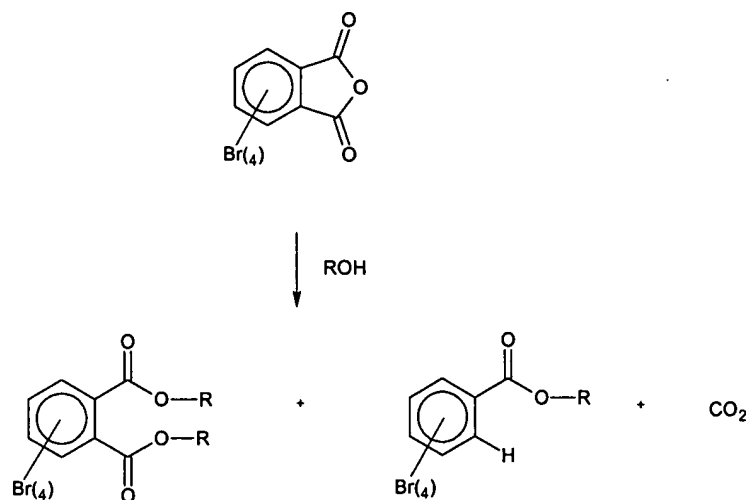
Claims 7 and 27 were amended after the Final Office Action. The amendments were acknowledged and entered in the Advisory Opinion.

V. Summary of Claimed Subject Matter

The following summary of the claimed subject matter is provided as required by 37 CFR §41.37(c)(v) as an explanation to place the invention in context for the Board. While this explanation is believed to be accurate, applicant does not offer this 'Summary of Claimed Subject Matter' as a substitute for the description and claims of the application.

¹ The post-appeal office action does not mention claim 35 as having been rejected pursuant to 35 USC §112, second paragraph. The office action is silent as to why claim 35 may have been found allowable as definite. Applicant appeals all claims rejected whether, or not, inadvertently omitted by the office action.

The claims at issue relate to the preparation of benzoate esters from phthalate and alcohol starting materials. A schematic of the reaction is shown:



The claimed invention addresses a method of increasing the yield of the preferred benzoate ester over the competing phthalate diester.

The following chart identifies written descriptive support for claim elements of independent claims in the specification.² As originally filed claims, the claims are descriptive support for themselves. *In re Gardner* 475 F.2d 1389, 177 USPQ 396 (CCPA 1973).

Claim element	Source in Specification
1. (Original) A method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride	[0001]

² Applicant is not unaware of 37 CFR §41.37(c)(1)(v) and the requirement thereof that page and line for subject matter support be provided in an Appeal Brief. However, 37 CFR §151(b)(6) provides that paragraph numbers may substitute for page and line numbering. Having elected to use paragraph numbers, Applicant does not expect the Board will find it more convenient to locate claim support by page and line numbers by counting down the number of lines from the top of the page, notwithstanding §41.37(c)(1)(v). Despite the internal inconsistency of the rules, Applicant submits the identification of written support by paragraph number will be found compliant with the rules.

comprising the steps of:	
combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;	[0006]
heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;	[0006]
feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification; and	[0006]
maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.	[0006]
19. (Original) A method for the preparation of tetrabromobenzoate esters	[0031]
comprising the steps of:	
feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor	[0031]

wherein the first of the at least one reactor contains a product mixture, the product mixture comprising tetrabromobenzoate ester,	[0031]
the at least one reactor having a temperature that favors decarboxylation over esterification; and	[0031]
maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.	[0031]

VI. Grounds of Rejection to be Reviewed on Appeal

1. Claims 1-15, 19-32 and 34 stand rejected pursuant to 35 USC §112, 2nd paragraph, as vague and indefinite, for use of the term “tetrabromobenzoate ester containing product.”³
2. Claims 1-15, 17-32, and 34-35 stand rejected pursuant to 35 USC §103 (b) as obvious over U.S. 5,637,757 in view of U.S. 4,375,551, further in view of 5,728,760.
3. So far as applicant can determine, the foregoing represents all pending claims and all grounds of rejection.

VII. Argument

Concerning 35 U.S.C. § 112, 2nd paragraph, rejections.

Claims 1-15, 19-32, and 34-35 stand rejected pursuant to 35 U.S.C. § 112, 2nd paragraph

³ See discussion under VII 1. (a) Argument. As previously noted, the record is not clear as to which claims stand rejected.

As being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The foregoing rejection was first raised in the final office action precipitating the initial appeal of this action. Applicants consistently responded that the pending claims are properly formed. Office actions have consistently denied the same, with the most recent office action adding a citation to the decision of *Ex parte Muench, et al.* 79 U.S.P.Q. 92 (BPAI 1948). The office action of 3/23/2006 elaborates on the rejection by urging that the verbs “containing”, and “comprises”, admit components in addition to tetrobromobenzoate ester.

There is uncertainty as to what other compounds are present in the product. Furthermore, it is well settled that the term “containing” do [sic does] not exclude the presence of other ingredients than the one recited.”

Office Action 3/23/2006, p. 3

Applicant does not disagree that the verbs ‘containing’, and ‘comprising’ used in patent claims admit other ingredients. *Ex parte Muench, et al.* supports the same. The terms are known and well understood concepts in the preparation of patent claims. It has been the law since at least *Ex parte Davis* 80 U.S.P.Q. 448, (BPAI 1948) that claims of an “open” nature, those using the verb “comprising” leav[e]s the claim open for inclusion of unspecified ingredients”. *Id.* at 450.

That there may be “other components present in the product besides the tetrabromobenzoate ester” is not a basis for rejection under 35 U.S.C. § 112, 2nd paragraph. That statute requires that claims “particularly point out and distinctly claim”. Compliance with the statute is tested by whether the claim would be understood by a person of ordinary skill in the art.

This first inquiry therefore is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity. It is here where the definiteness and the language employed must be analyzed - not in a vacuum, but always in

light of the teaching of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art.

In re Moore, 58 CCPA 1042, 1046-1047, 439 F.2d 1232, 1235, 169 U.S.P.Q. 236, 238 (1971) (footnote omitted, emphasis added).

There is no assertion in any office action that a person of ordinary skill in the art would be confused by the scope of the claim language. As such, the office actions fail to state a lawful basis for rejections of claims 1-15, 19-32, and 34-35 pursuant to 35 USC §112, second paragraph as indefinite. The office actions state the potential for the presence of other ingredients as the basis for the 35 U.S.C. § 112, 2nd paragraph, rejection. The office action confuses claim breadth with indefiniteness. “Breadth is not indefiniteness” *In re Gardner et al.* 57 CCPA 1207, 1210, 427 F.2d, 786, 788, 166 U.S.P.Q. 138 (CCPA 1970); see also *In re Robins*, 57 CCPA 1321, 1328, 429 F.2d 452, 458, 166 U.S.P.Q. 552 (CCPA 1970). The fact that components in addition to the tetrabromobenzoate ester may be present does not render the claim indefinite. The claim fully satisfies the statutory mandate of 35 U.S.C. § 112, 2nd paragraph. For the foregoing reasons, the stated rejection of claims 1-15, 17-32, and 34-35 for indefiniteness must be reversed.

Concerning 35 U.S.C. §103 (a) rejections.

Claims 1-15

U.S. Patent 5,637,757 is relied upon as the primary reference in the instant rejection of claims 1-5, 17-32, and 34-35 under 35 U.S.C. § 103(a).

The Rejection:

The ‘757 reference is relied upon as “impl[ing] that the esterification can be conducted near [100-160°C] in addition to other [sic] temperature range of from 160 to 230°C”.

Office Action, 3/23/2006, p. 5, lines 6-8.

US 5,637,757, the primary reference.

It is useful to compare the statements in the office action with the source statements in the '757 reference:

In general, tetrabromophthalic anhydride is reacted with the appropriate alcohol in the presence of a decarboxylation catalyst.

'757 reference Col. 2, lines 3-5. (emphasis added)

Alcohols useful in the present invention include alcohols having a boiling point of between about 160°C and about 230°C, preferably between 180°C and 205°C.

'757 reference Col. 2, lines 53-55.

In examples 1-8, the reactants were heated to reflux temperatures. Example 8 involves a proprietary mixture of C₇ and C₉ alcohols as the reaction medium. The composition, and therefore the reflux temperature are unknown. Example 8 will not be discussed further. In examples 1-4, 2-ethylhexanol served as the reaction medium, and alcohol reactant. The b.p. of 2-ethylhexanol is 164°C. The reaction medium of example 5 comprised a mixture of 2-ethylhexanol and 2-ethoxyethylether, b.p. 180-190°C. 2-butoxyethanol, b.p. 171°C, was the reaction medium and alcohol reactant in example 6. 2-ethoxyethoxyethanol, b.p. 194°C was the reaction medium and alcohol reactant in example 7. '757, Col. 7, line 9 - Col. 8 line 9.

So far as can be determined by reading the disclosure of the '757 reference, the reaction medium for all examples of the '757 reference prepare a benzoate ester at boiling points in excess of 160°C.

The '757 reference discloses use of alcohol reactants having boiling points below 160°C only in combination with "high[er] boiling solvents". '757 reference Col. 4, line 26. The '757 reference states the following with respect to the use of alcohol reactants having boiling points below 160°C:

Alternatively, alcohols with boiling points below 160°C can be used in combination with a high boiling solvent. In particular, alcohols with boiling points between 100°C and 160°C may advantageously be used in that manner.

‘757 reference Col. 4, lines 25-28. (emphasis added)

Note: the office action has not identified any portion of the ‘757 reference as teaching reaction temperatures below 160°C!

Applicant finds no support in the ‘757 reference for the statements of that:

With respect to the unspecific reaction temperature for the partial esterification, [‘757] discloses that the alcohols with the boiling points between 100°C and 160°C may be advantageous. (See Column 4, Lines 26-28). In reaction process, which implies that the esterification can be conducted near that temperature range in addition to other temperature range of from 160 to 230°C;”

Office Action 03/23/2006 p.5, lines 3-7.

It is clear from the ‘757 reference that mention of alcohols having boiling points from 100-160°C is a descriptive property of esterifying reactants not a description of reaction conditions, i.e., the temperature of the reaction medium which as exemplified in ‘757 is the reflux temperature of the reaction medium. The ‘implication’ urged by the office action finds no support whatsoever in the ‘757 reference.

US Patent 4,375,551

The office action of 03/23/2006 relies upon U.S. Patent 4,375,551 as a secondary reference for disclosing a favorable reaction temperature for the esterification of phthalic anhydride. The ‘551 reference relates to the manufacture of a diester of tetrabromophthalate. It is not surprising, therefore, that the ‘551 reference contains no disclosure related to decarboxylation of a phthalate monoester.

US Patent 5,728,760

The post-appeal office action of 03/23/2006 adds the reference U.S. Patent 5,728,760 as a further secondary reference in the office action.

It bears repeating that applicant's claims are directed to "[a] method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride". Preamble of claim 1. Example 1 of the '760 reference starts from tetrabromobenzoic acid to form tetrabromobenzoate ester,⁴ not tetrabromophthalic anhydride, as in applicant's claims. Since the benzoate has 1, not 2, carboxylic groups as does the phthalate, the reference is not relevant to applicant's claims which include "maintaining at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester containing product". Claim 1.

Notwithstanding the literal text of the '760 reference, the 03/23/2006 office action states:

Similarly, the ['760] reference expressly has disclosed the method of preparing tetrabromobenzoate esters from tetrabromophthalic anhydride in the presence of decarboxylating sodium carbonate at 200°C (See Col. 5, lines 45-67).

Office Action, 03/23/2006, p.7, lines 3-6.

The foregoing statement in the office action is false. '760, Col 5, lines 45-67 relate to the formation of tetrabromobenzoate esters from tetrabromobenzoic acid, not tetrabromophthalic anhydride as stated in the office action. Furthermore, after the benzoate ester is formed, no carboxylate moiety remains on the aromatic ring to be "decarboxylat[ed by] sodium carbonate". Office Action, 03/23/2006, p.7, lines 5-6.

Elsewhere in the '760 reference, examples 3-9, preparation of tetrabromobenzoate esters from phthalate is exemplified. However, examples 3-9 or the '760 reference read on examples 1-7 of the '757 reference previously discussed. The post-appeal office action directly identifies only example 1 of the '757 reference as applicable to claims 1-15.

⁴ U.S. 5,728,760, 5, Lines 45-67

Examination of the cited references identifies no reference, or combination thereof, that arrives at applicants claims 1-15.

Claims 19-32 and 34-35

The post-appeal office action does not separately address claims 19-32 and 34-35. The office action identifies no teaching or suggestion that reactants be charged to a reactor containing tetrabromobenzoate ester contained in any reference of record.

US Patent 5,637,757

The primary reference, '757, discloses in examples 1-8 preparation of tetrabromobenzoate ester. In every example of '757 reactants are added to a vessel followed by heating the vessel and contents to reflux temperature, presumably from ambient.

US Patent 4,375,551

Secondary reference '551 disclose examples 1-9 and 11-14 concerning preparation of diallyl tetrabromophthalate. The claimed tetrabromobenzoate ester is not disclosed by the '551 reference. Examples 1-9 follow the process disclosed by example 1 which provides reactants added to a reaction vessel followed by heating, presumably from ambient, to 90–95°C, the reaction products of the first step are cooled to room temperature then transferred to a second vessel for heating to 100-110°C. Examples 11-14 follow the process of example 1 substituting a reactant. The office actions identify no portion of the '551 reference teaching or suggesting that reactants be added to a reactor containing tetrabromobenzoate ester. Moreover, the temperature of the vessels in the '551 reference is raised from ambient to the reaction temperatures. No vessel in the '551 reference has reactants added to contents (product mixture containing tetrabromobenzoate ester) “having a temperature that favors decarboxylation over esterification”.

Accordingly, the '551 reference discloses no teaching or suggestion concerning 'adding to' element of claims 19-32 and 34-35.

US Patent 5,728,760

Secondary reference '760 discloses in example 1 heating reactants in a vessel, presumably from ambient, to 200°C. Moreover, the reactants are not tetrabromophthalic anhydride, or tetrabromophthalic diacid, as claimed, but rather is tetrabromobenzoic acid. Example 2 discloses heating reactants to reflux temperature of 2-ethylhexanol, presumably from ambient. Moreover, the reactants are not tetrabromophthalic anhydride, or tetrabromophthalic diacid, as claimed, but rather is dibromophthalic anhydride. Examples 3-10 are found in the '757 reference discussed above. The office actions identify no portion of the '551 reference teaching or suggesting that reactants be added to a reactor containing tetrabromobenzoate ester. No vessel in the '760 reference has reactants added to contents (product mixture containing tetrabromobenzoate ester) "having a temperature that favors decarboxylation over esterification."

Rejection of Claims for Obviousness

Basis for Combining References

A basis for combining references must be identified by the office actions:

While the references need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability must be "clear and particular."

Ruiz v A.B. Chance Co. 234 F.3d 654, 665, 57 U.S.P.Q. 2d 1161, 1167-1168. (Fed. Cir. 2000) (internal citations omitted).

The post-appeal office action, for the first time, states as a basis for combining the teachings of the references in the following remark:

All the process have been commonly involved in the method of preparing tetrabromobenzoate esters from tetrabromophthalic anhydride in the presence of sodium carbonate.

Office Action, 3/23/2006, p. 7, lines 13-15.

As noted above, this remark in the post-appeal office action is false. The '551 reference prepares tetrabromobenzoate esters from tetrabromobenzoic acid, not from tetrabromophthalic anhydride. Therefore "all the processes" do not involve preparing tetrabromobenzoate esters from tetrabromophthalic anhydride. Accordingly, the office action fails to provide a 'clear and particular' showing that the disclosures of the applied references should be combined. The obviousness rejection should be reversed because the office actions fail to show why the references are combinable, and because the stated reason is false on its face in view of the applied references.

The '757 reference discloses carbonate as a catalyst for decarboxylation. '757, Col. 2, lines 33-42. The '551 reference discloses a catalyst, but the catalyst is not carbonate, and the catalyzed reaction is not decarboxylation. The catalyst of the '551 reference is allyl triethylammonium chloride. Col. 4, lines 4-9. As previously noted, the '551 reference does not involve decarboxylation, rather both carboxylates of the phthalic moiety are esterified. Thus there is no carboxylate to be removed from the phthalic moiety.

For the foregoing reasons, also it is improper to attempt to combine the teachings '551 with the '751 and/or the '760 reference because the references concern unrelated art.

The only motivation identified in the office action to combine references is the false assertion that all the references utilize a carbonate component, the false assertion that all the references address the preparation of tetrabromobenzoate esters, and the false assertion that all the references make use of tetrabromophthalate as starting material. In the absence of a motivation to combine the references, the combination is improper. *In re Fritch* 972 F.2d 1260, 1266, 23 U.S.P.Q. 2d 1780 (Fed. Cir. 1992).

Combined References Do Not Arrive at the Invention

It is further required that fairly combined of references arrive at the claimed invention. *ACS Hospital Systems, Inc. v Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984); *In re Geiger* 815 F.2d 686, 688, 2 U.S.P.Q. 2d 1276, 1278 (Fed. Cir. 1987).

The references of record, even when combined, do not arrive at the claimed invention. As to claims 19-32, and 32-34 no reference of record, nor combination thereof, discloses feeding reactants to a product mixture containing tetrabromobenzoate or feeding reactants to a reactor with contents having a temperature that favors decarboxylation over esterification. For this reason also the rejection of claims 19-32, and 32-34 must be reversed.

As to claims 1-15, no reference of record, nor combination thereof, discloses feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification. For this reason also the rejection of claims 1-15 for obviousness must be reversed.

Use of Applicants Claims as a Roadmap

The analysis in the examination finds no suggestion or motivation to apply reaction conditions from an esterification reaction to a decarboxylation reaction as taught by the '551 reference. Rather, the analysis reconstructs applicants' claims using the claims themselves as a guide. Only by picking and choosing components (and by misrepresenting the content) from the applied references does the instant examination arrive at the urged rejection of claims 1-15, 17-32, and 34-35.

The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure.

In re Dow Chemical 837 F.2d 469, 473, 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988) (internal citations omitted).

There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant's disclosure.

Id., at 1532.

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

W.L. Gore and Assoc. v Garlock, Inc. 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983), quoted in *In re Fine* 837 F.2d 1071, 1075, 5 U.S.P.Q. 2d 1596, 1600 (Fed. Cir. 1988).

The office actions demonstrate no lawful reason to combine the teachings of the applied references. Rather the office actions demonstrate the use of applicants claims as a guide to pick and choose components of the claims from among references. Aided by factual misrepresentations of the teachings of the references the claims are rejected for obviousness.

Applied References Must Be Considered "as a whole"

Further, in considering prior art references it is essential that the references be considered "as a whole". *In re Lunsford* 357 F.2d 385, 389, 148 U.S.P.Q. 721 (CCPA 1966). As a whole, teachings having no relations to decarboxylation, no use of decarboxylation catalyst as catalyst for the disclosed reaction ('551) and disclosures of "one-pot method" ('757, Col. 1, line 43) and teachings of the formation of tetrabromobenzoate esters from tetrabromobenzoic acid do not teach or suggest applicants claims directed to "feeding the tetrabromophthalic half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification".

Conclusion

The office action of 03/23/2006 concludes with the argument that

Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the ['760] decarboxylating temperature along with the limitations of ['551] optimum first-step reaction temperature and the use of plural reactors into the ['757] process in order speed up the reaction process and react all the reactants to its [sic] completion. This is because the skilled artisan in the art would expect such a combination of the ['760] decarboxylating temperature, the ['551] optimum first-step reaction temperature parameter and the use of plural reactors into the ['757] process to be successful and to be efficient as the guidance shown in the ['551].

Office Action, 3/23/2006, p. 8, lines 3-11.

This argument is fatally flawed. First, because the portion of the '760 reference specifically identified and quoted in the office action has no relation to decarboxylation. The esterified benzoic acid has no carboxyl moiety to remove.

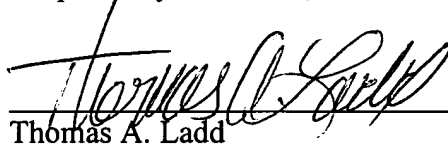
The office action looks to the '551 reference to supply the claim element of a plurality of reactors. But, the '551 reference does not involve decarboxylation. The office action looks to the '760 reference to provide an optimum decarboxylating temperature, but the '760 does not involve decarboxylation or suggest a temperature for decarboxylation, furthermore, the '760 adds no disclosure beyond the '757 reference related to the preparation of tetrabromobenzoate esters from tetrabromophthalic starting material.

The references may not be combined consistent with the law. When combined, the combined disclosures do not arrive at the invention, as claimed.

Wherefore, applicants pray that this board:

1. Reverse the rejection of claims 1-15, 17-32, and 34-35 as indefinite pursuant to 35 U.S.C. § 112, 2nd paragraph;
2. Reverse the rejection of claims 1-15, 17-32 and 34-35 as obvious pursuant to 35 U.S.C. § 103(b); and
3. Extend the term of the patent to be granted on claims 1-15, 17-32, and 34-35 pursuant to 35 U.S.C. § 154.

Respectfully submitted,



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VIII Claims Appendix

1. (Original) A method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride comprising the steps of:
 - combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;
 - heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;
 - feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification; and
 - maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.
2. (Original) The method of claim 1 wherein the temperature that favors partial esterification over complete esterification is greater than about 70°C.
3. (Original) The method of claim 2 wherein the temperature that favors partial esterification over complete esterification is between about 90°C and about 130°C.
4. (Original) The method of claim 1 wherein the temperature that favors decarboxylation over esterification is above about 190°C.
5. (Original) The method of claim 4 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.
6. (Original) The method of claim 1 wherein the alcohol has a boiling point between about 100°C and about 230°C.
7. (Previously Amended) The method of claim 1 wherein the alcohol has the formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.
8. (Original) The method of claim 1 wherein said step of combining the tetrabromophthalic anhydride and an alcohol occurs in the presence of an inert solvent.

9. (Original) The method of claim 8 wherein the inert solvent is an ether having a boiling point between about 160°C and 230°C.

10. (Original) The method of claim 1 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

11. (Previously Amended) The method of claim 1 wherein at least 85% of the tetrabromobenzoate ester-containing product consists of tetrabromobenzoate ester.

12. (Original) The method of claim 1 wherein the at least one reactor contains tetrabromobenzoate ester when feeding the tetrabromophthalate half-ester intermediate mixture to at least one heated reactor.

13. (Original) The method of claim 1 wherein the at least one reactor includes a plurality of heated reactors connected to one another in series.

14. (Original) The method of claim 13 wherein the first of the plurality of heated reactors contains tetrabromobenzoate ester when the tetrabromophthalate half-ester intermediate mixture is fed to at least one heated reactor.

15. (Original) The method of claim 1 wherein said step of feeding the tetrabromophthalate half-ester intermediate mixture is continuous such that the half-ester intermediate mixture is continuously fed to the at least one reactor, while the tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.

16. (Cancelled).

17. (Previously Amended) A method for preparing a flame retarded polymer resin comprising the steps of:

combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;

heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;

feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification;

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce tetrabromobenzoate ester;

preparing a polymer mixture; and

adding the tetrabromobenzoate ester to the polymer mixture.

18. (Previously Amended) The method of claim 17 wherein the polymer mixture comprises polyvinyl chloride, polyurethane, or mixture thereof.

19. (Original) A method for the preparation of tetrabromobenzoate esters comprising the steps of:

feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor wherein the first of the at least one reactor contains a product mixture, the product mixture comprising tetrabromobenzoate ester, the at least one reactor having a temperature that favors decarboxylation over esterification; and

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.

20. (Original) The method of claim 19 wherein said product mixture includes a decarboxylation catalyst.

21. (Original) The method of claim 20 wherein the decarboxylation catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

22. (Original) The method of claim 19 said step of feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor further includes feeding a decarboxylation catalyst to the at least one reactor.

23. (Original) The method of claim 22 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

24. (Original) The method of claim 19 wherein the temperature that favors decarboxylation over esterification is above about 190°C.

25. (Original) The method of claim 24 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.

26. (Original) The method of claim 19 wherein the alcohol has a boiling point between about 100°C and about 230°C.

27. (Previously Amended) The method of claim 19 wherein the alcohol has the formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.

28. (Original) The method of claim 19 further comprising the step of adding an inert solvent to the at least one reactor, the inert solvent having a boiling point above about 160°C.

29. (Original) The method of claim 28 wherein the inert solvent is an ether.

30. (Original) The method of claim 19 wherein the at least one reactor includes a plurality of reactors connected in series to one another.

31. (Original) The method of claim 19 further comprising the step of combining the either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to form a first reaction mixture prior to said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol.

32. (Original) The method of claim 19 wherein said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to at least one reactor is continuous such that either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol are continuously fed to the at least one reactor, while the tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.

33. (Cancelled).

34. (Previously Amended) A method for preparing a flame retarded polymer resin comprising the steps of:

forming a tetrabromobenzoate ester-containing product using the method of claim 19;

preparing a polymer mixture; and

adding the tetrabromobenzoate ester-containing product to the polymer mixture.

35. (Previously Amended) The method of claim 34 wherein the polymer mixture comprises polyvinyl chloride-polyurethane, or mixture thereof.

IX. Evidence Appendix

none

X. Related Proceedings Appendix

none